YEARBOOK

OF THE

ASSOCIATION

OF

PACIFIC COAST GEOGRAPHERS

Volume I.

1935

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OF THE ASSOCIATION OF

PACIFIC COAST GEOGRAPHERS

Volume I., 1935.

Published at Cheney, Washington.

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ORGANIZATION

The Association of Pacific Coast Geographers was organized June 27th, 1935, at the University of California at Los Angeles. During the preceding winter letters had been sent to teachers of geography in institutions of higher learning and to research workers interested in the subject. The response to the letters proved favorable and Otis W. Freeman of Cheney, Washington, solicited papers for a two-day meeting. In all, 21 papers were presented at the meeting on June 26 and 27th. Dr. Otis W. Freeman was elected chairman and Miss Vinnie B. Clark of the State Teachers College, San Diego, secretary. On Wednesday afternoon, June 26, H. F. Raup, of the Geography Department of the University of California at Los Angeles, conducted a tour of Los Angeles harbor and adjoining areas.

At the organization meeting the following were elected for the year 1935-36:

President—Otis W. Freeman, State Normal School, Cheney, Washington.

Vice President—George C. Kimber, Junior College, Sacramento, California.

Secretary-Treasurer—Willis B. Merriam, Department of Geography, University of Washington, Seattle, Washington.

It was decided to hold the second meeting of the Association of Pacific Coast Geographers at the University of Washington in June, 1936, in connection with the meetings of the Pacific Division of the American Association for the Advancement of Science.

It was decided to publish an annual volume of proceedings to contain abstracts of all papers presented and as many papers in full as available funds would permit.

The following constitution was adopted:

CONSTITUTION OF ASSOCIATION OF PACIFIC COAST GEOGRAPHERS

Article I.

Name—This society shall be known as the Association of Pacific Coast Geographers.

Article II.

Object—The object shall be the promotion of scientific research in Geography and the diffusion of the resulting scientific knowledge.

Article III.

Membership—Membership shall incude anyone interested in the purpose of this society on the annual payment of $2.00.

Article IV.

Officers—The officers shall consist of: President, Vice President and a Secretary-Treasurer. These three shall constitute the executive council to plan and supervize the work of the organization.

All officers shall be chosen by ballot on the nomination of the nominating committee or from nominations made on the floor at the annual meeting.

Officers shall hold office for one year or until their successors qualify.

Article V.

Business of Officers—The officers shall designate the time and place for an annual program meeting, at which time officers for the ensuing year shall be elected. It shall be the special duty of the Secretary to arrange the program for this meeting. In case of a vacancy during the year caused by the death or resignation of one of the three officers the remaining two shall select a successor to fill out the vacant term.

Article VI.

Standing Committees—There shall be a membership committee and such other committees as may be appointed by the officers or chosen at the annual meeting.

Article VII.

Amendments—Amendments to these articles may be made at any annual meeting by a vote of two-thirds of the members present and voting.

YEARBOOK OF THE ASSOCIATION OF PACIFIC COAST GEOGRAPHERS

Volume I 1935

The Italian-Swiss Dairymen of San Luis Obispo County, Calif.

H. F. RAUP
University of California at Los Angeles
(SEE MAP, PAGE 17)

A number of Italian-Swiss emigrant laborers began to settle in San Luis Obispo county about 1886.[1] They came almost entirely from the Canton Ticino, and the movement continued until the early part of the twentieth century. The migration was directly induced by the establishment of a single dairy ranch, owned by George and E. W. Steele, and located on Rancho Corral de Piedra. The population of the region was already well mixed, with many Mexicans, north Europeans, and a slowly increasing number of native Americans. A dairy ranch among these people was distinctly a pioneers enterprise, for San Luis Obispo county had been producing principally wheat, range cattle, and sheep, and the county was much too distant from consuming markets to justify the production of butter and cheese. There was no rail transportation to San Fransico, the nearest center where such products might find a market, but by 1875, the problem had been solved by means of coastwise steamers which made regular trips to the city.

In spite of apparent handicaps, the Steele Brothers dairy grew until it became the second largest in the state, with a herd of 1,400 cows, chiefly American stock crossed with English breeds. Ranch employees, especially milkers, were in demand. The firm of Steele Brothers had previously owned a dairy in Marin county, where the Italian-Swiss colony was occupied with the production of wines, but a number of the men were also ranch employees. Steele Brothers therefore drew upon Marin county for many of their milkers, and there is a close relationship between the Italian-Swiss families now living in Marin county, and those in San Luis Obispo county, although after 1880 the immigrants came directly to San Luis from Switzerland.

The region from which most of them came is the Val Maggia, one of a number of deep valleys on the southern slope of the Alps, in the Lake Maggiore region, noted for its emigration during the nineteenth century. The valley receives exceptionally heavy fall and spring rains, sometimes to the amount of eighty inches per year, and since it is sheltered from the north, its temperatures are those of the Mediterranean. It is, however, much more humid than the Koppen classification *Cs* would indicate. As a result, the valley floor is essentially agricultural in character, producing chestnuts below 6,000 feet, and vineyards, mulberries,

and maize. The vegetation is predominantly non-Mediterranean and the olive and other southern plants are not grown extensively. At higher levels, goats are raised, and cattle raising is of special importance.

Most of the small villages of the Maggia have specialized in their products and in the occupations of their people. Someo,[3] with 266 residents in 1920, raises cattle, and its agriculture is chiefly that of the vineyard. This village sent many of its people to California. Solduno, a village of 538 people in 1920, located on the delta of the Maggia, has many vineyards and fields of asparagus. The town of Gordola, near Locarno, with 626 people in 1920, produces chestnuts and cattle; many of its inhabitants have migrated to San Luis Obispo. Two villages, Peccia, population 217, and Lavizzara, manufacture a soft cheese similar to Gorgonzola. Most of the product is consumed locally under the name of **formaggio dolce** or **formaggio della paglia.** The latter name is derived from the custom of packing the cheese in straw for ripening and for sale. It has been estimated that a total of 3,000 imigrants has come to California from such villages.[4] The Val Maggia alone lost 44% of its population from 1850 to 1930, and one district near Frasco lost 60%. Between 1881 and 1930, the total number of emigrants from the valley was over 25,000. The immediate cause of the migration was excessive division of the landholdings: in other words, a density of population out of proportion to the cultivated land, which constitutes only 12% of Canton Ticino. The emigration was not altogether without its advantages to the canton, for the emigrants, to an unusual degree, maintained communication with their former townspeople, and after their fortunes improved in California and elsewhere, returned to the Val Maggia, where their villas and other evidences of affluence are not in harmony with the comparative poverty of the native resources.

The emigrants landed at San Francisco, some of them finding their way to the vineyards and dairies of Marin and Sonoma counties, and some going southward by train and by wagon to San Luis Obispo. In later years, they landed at New York, and reached the west coast by rail. The region to which they came, and which had been described in very favorable terms by those who had returned to the Ticino, lies very close to the coast, in the small valleys on the seaward side of the coast ranges, from San Luis Obispo and Morro Bay northward to San Simeon. It receives an annual rainfall averaging twenty inches at San Luis Obispo city, which is located a few miles from the coast, to twice that amount at Big Sur, some distance northward on the coast. In the absence of sufficient data, it may be assumed that the average amount received by the costal district from Morro northward is about thirty inches annually, considerably less than that received by the Val Maggia. From the standpoint of a dairyman, however, the comparatively high relative humidity along the coast would tend to offset the lesser amount of rain at San Luis, for it permits the growth of a fairly good grass cover on the coastal side of the mountains. Temperatures at San Luis Obispo are of the *"Csbl"* type—Mediterranean

with a slightly delayed maximum due to the fogs of the coast. Winter temperatures are much more mild than those of the Val Maggia. This factor makes possible year-round grazing, and made the use of barns in San Luis Obispo county almost unnecessary. Climatically, the coast had much to recommend it to the Swiss milkers.

The land on which they settled is rugged coast for the most part, with narrow wave-cut terraces similar to the long bench north of Pismo Beach. The trend of the coast ranges is toward the northwest, and the San Luis, Chorro, and Los Osos valleys open toward Morro Bay in that direction (see land utilization map), giving a corridor to the sea and access to the coastal region north of Morro Bay, otherwise inaccessible because of the difficulty in crossing the coast ranges from the Santa Margarita valley. Small transverse valleys, heading up in the Santa Lucia range, open seaward, with their lower portions evidently undergoing subsidence, for their normal stream bottoms have been covered deeply with recent alluvium, until in almost every case level valley floors have been formed. These floors are of peculiar importance to the dairyman, for the tendency toward poor drainage and the high water table give very satisfactory summer pasture lands with green feed, at a time when the pastures on the hill slopes and terraces have been grazed to their fullest extent. Recently, profits in truck crops have brought about a change, and some of the stream bottoms, especially in the upper end of Los Osos valley, have been producing lettuce and sugar beets under the control of Japanese gardeners. The Swiss people do not have even kitchen gardens on their ranches.

The dairymen have concentrated in greatest numbers near the town of Cayucos, where 44% of the heads of families in 1931 were of Italian-Swiss origin or descent. They are also numerous in the region around the city of San Luis Obispo, and in the Harmony valley, a localized dairying center between Cayucos and Cambria. At Cayucos, family names such as Righetti, Bonetti, Tomasini, Gaggioni, Donati, and Robasciotti are common. These and other families emigrated to California as dairy laborers, worked a relatively short time, and then rented a farm with a few cows. Within a decade or two, most of them were able to purchase dairies. They did not intermarry with the Californians, but brought wives from Canton Ticino with them. Sometimes they made a small fortune and returned to Ticino for their wives. The migration was therefore definitely of the family type.

With the Swiss permanently settled at San Luis, shipments of their products, cheese and butter, began to leave San Simeon, San Luis, and Cayucos by coastwise steamer, bound for San Francisco. The transportation was handled by shipping agents, and by 1893, the exports increased until the small roadstead port of Cayucos sent over one million pounds of butter and 62,000 pounds of cheese. Other products included beans, wheat, and barley. Until 1875, when the Swiss became numerous, the coastal region produced only wheat, and the grazing was chiefly that of range cattle and sheep, but with increasing profits to be made in the dairy business,

the Swiss brought about a change in the land utilization, and tame hay and dairy cows replaced the wheat and sheep. The whole area experienced an agricultural and mining boom from 1870 to 1880 when the many large ranches were sub-divided and the cinnabar mines near Cambria became profitable.

The coastal dairying region lost the dominance of the industry from 1890 to 1900, and the greatest growth shifted to the San Joaquin valley counties, until in 1930, San Luis Obispo county had been reduced to tenth place among the counties in number of dairy cows and dairy farms, twelfth place in gallons of milk produced, and fifteenth place in the production of butter fat.[5]

The farms which the Swiss were able to establish have been so well conducted that for the greater number of owners, retirement with a moderate amount of wealth has been possible, either in urban San Luis Obispo or in the Val Maggia. One of the dairy ranches in Los Osos valley is still operated by Turri Brothers. It consists of 1100 acres of bottom-land, all summer pasture except 200 acres. One hundred Holsteins are milked, and the product is marketed fresh in San Luis Obispo. Some of the lowland along Los Osos creek produces lettuce which is shipped to Los Angeles. The Turri ranch house, built of adobe, conforms to the practice common in Los Osos and Chorro valleys of locating ranch houses and barns near the summits of small rock bosses above the low level of the valley bottoms. Another typical dairy ranch, on Cayucos, creek, consists principally of pasture, with 1500 acres grazing a herd of 23 Guernseys. Few of the Swiss ranchers favor modern dairy pracitce. Testing of cows is not common, and the farm advisor reports much difficulty in getting cooperation from the dairymen.

Among themselves, however, many of the Swiss dairymen are associated with a local cooperative creamery which handles their milk, and manufactures butter and cheese, principally of the Monterey or "jack" variety, and markets the product. There are several creameries in San Luis Obispo which compete with the cooperative creamery, and the Swiss alternate in sending their milk to the cooperative organization and to the independents. There was a tendency to form a cooperative organization as early as 1891, but the attempt was abortive, and the present organization began in 1913.

Since the Swiss residents have found their dairy practices successful in past years, they prefer to retain old methods, without modernizing equipment or structures, and without attention to improvement of the herds. This is especially noticeable where the original owner of the dairy ranch has retired, and has rented his ranch to younger men. The ranch buildings deteriorate rapidly and are not kept in repair by the tenants, who occupied fifty per cent of the dairy ranches in 1925.[5] Under such conditions, many of the houses and especially the barns have a poverty-stricken appearance, not justified by the resources or wealth of the region. House types are varied; the older houses are small and are of frame construction, and very commonly these are in use, though the present ranch owner or tenant lives in

a one-story stucco building adjoining the original house. The frame house of the period of the 70's and 80's in California was at once adopted by the Italian-Swiss. In the Val Maggia and elsewhere in the Ticino, the common rural house is the Mediterranean type, made of courses of thin field stone, undressed, with roof of large slabs of stone or slate. Many of the houses have two stories, though in the upper parts of the valleys, the house may be little more than a large stone roof set on very low walls. Wood is at a premium. In San Luis Obispo county, no such house types are found, for wood is available on the upper slopes of the coast ranges, and the stone slabs are lacking in the hills.

The San Luis Obispo barns, with a few exceptions, are wood, poorly built, and have been built within the last quarter-century. They conform to the usual California barn in type, with a high central section and stalls on either side. They are in no way associated with structures in the Canton Ticino. Other cultural items bear no resemblance to those which prevail in Switzerland. The goat herds, the two-wheeled market carts, the vineyards, are not a part of the lives of the San Luis Italian-Swiss. They use no Italian placenames of importance, but have taken over the English or Spanish names of the region.

The Swiss brought relatively little of their European background to this country, although their comparative isolation along the coast has furthered the perpetuation of some of their customs and practices. Of partiular importance was their skill in dairying, and this they have developed to such an extent that it has almost excluded other occupations among them. But it is a very different type of dairying than that of the Ticino, for the herds are larger, the stock is of better grade, the grazing is much better, and use of goats is entirely lacking. Even the cheese they manufacture here, the "jack" type, bears no relation to the **formaggio della paglia.** Living conditions are superior to those to which they were accustomed. They have kept the Italian language and it is still spoken commonly in the rural districts on "this" side of the San Lucia range, on the rancho and in decaying villages such as Cayucos, although some of the members of the generation born in this country refuse to use the tongue. The change in country has not affected the adherence of these people to the Catholic church—a fact quickly evidenced by a check of the cemeteries, both Catholic and Protestant.

The Swiss settlers in San Luis Obispo, confined almost entirely to the remote western side of the Santa Lucia range, have in large part determined the character of the local development of the country as a grazing center. Whether similar development would have taken place under the direction of American ranchers seems doubtful in view of the rapidity with which the Swiss occupied the region as laborers, then as tenants, and finally as property owners, acquiring wealth from the economical handling of the herds. Such residents with European backgrounds give diversity to the settlement pattern of the state, and they have contributed in large part to the agricultural wealth of

the state. In the case of San Luis Obispo county, the Swiss ranchers have made effective use of the coast lands and native vegetation in the successful development of a specialized industry: they are, in fact, responsible for the current land utilization of the area.

REFERENCES

[1] First notice of Swiss settlers in San Luis Obispo County appears in the San Luis Pioneer, Vol. 5, No. 213, September 13, 1873. For general economic and geographic descriptions of San Luis Obispo and the Santa Lucia area, see the various papers of John Wesley Coulter. The presence of a Swiss element in the population, however, has been entirely ignored from a cultural standpoint by Mr. Coulter and others.

[2] Data on Someo and other Swiss villages may be found in Dictionaire Geographique de la Suisse (Neuchatel, 1902), and Dictionaire Historique et Biographique de la Suisse (Neuchatel, 1932).

[3] Dictionaire Geographique de la Suisse, 6: 219.

[4] Compiled from the San Luis Obispo directory, 1931-1932 (San Luis Obispo, 1932).

[5] San Luis Obispo Tribune for May 5, 1894. Souvenir edition.

[6] Bureau of the Census report, 1930.

[7] MS. notes of the late Thomas F. Hunt, in files of the U. C. Dept. of Agriculture, Berkeley, Cal. More recent figures would probably be somewhat lower, for many of the ranchers have been forced to operate their own ranches during the last five years.

The Hop Industry of the Yakima Valley, Washington

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State Normal School, Cheney, Washington

The Yakima Valley in south central Washington comprises one of the most productive irrigated areas in the United States. The Yakima River and other streams with sources in the Cascades supply the needed water. The Yakima Valley is separated into two nearly equal divisions by a ridge crossing the Valley through which the Yakima River has cut a passage called Union Gap. Hops are commercially grown chiefly around Toppenish and Moxee City in the upper Valley.

Moxee Valley lies at an elevation of 1,000 feet above sea level. The soil is deep and fertile and is mostly classified as Yakima sandy loam. It is generally well drained which prevents alkali accumulation destructive to hops. Most Moxee hop farmers have fifteen to twenty acres in the crop. In 1929 Yakima County had 126 farmers with 2,172 acres in hops that produced 4,044,650 pounds. This was about 5/6 of the production in the state. Only the Salem district in Oregon exceeds the Yakima Valley in importance in the Union.

Hop vines are raised from cuttings placed in rows 8 feet apart. The crop requires much labor during the year, including pruning the roots in the spring, several irrigations and cultivations when necessary, stringing the vines, and finally picking and curing the hop cones. Hops are generally raised by the wire trellis system with cross wires between the poles to support the vines.

Labor for picking consists of local residents, Indians from the Yakima Reservation, and transients. Several thousand workers are needed during the hop picking season. Hops are cured in kilns, generally built of wood 30 or 40 feet square. The quality of beer depends in part upon certain constituents of hops, especially soluble resins and lupulin. The greatest handicap to hop producers comes from great price variations. The legalization of beer caused high prices which resulted in expanding production faster than consumption and as a result prices in 1934-35 were generally under the cost of production.

The Human Ecology of Baja California

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Baja California is one of the most thinly settled parts of North America south of the arctic region. Unfavorable natural conditions, together with political and commercial isolation have prevented the development of this detached Mexican territory. The population at the present times amounts to about twice the number of Indians estimated to have occupied the peninsula in the 18th Century. The people are not primitives, for the remnant of aborigines is small and the great majority of the inhabitants are Hispano-Americans in blood and culture.

The area of Baja California is 61,000 sq. mi., or 38% of that of the state of California. According to the official Mexican census of 1930 the population was then 94,469, indicating a density of 1.69 persons per sq. mi., which was a substantial increase from the density of 1.14 in 1920. The number of inhabitants in the mining and border towns is subject to great fluctuations, which are important in relation to totals and density in such a small population. In the last five years the repeal of prohibition in the United States and the reduced scale of operation of the copper mines have induced many persons to leave the peninsula. My own estimates made in 1934 and 1935 indicate that the present population is scarcely in excess of 60,000, giving a density of slightly less than 1.0 per sq. mi.

There are five towns with a population of more than 1000 (Tijuana, Mexicali, Ensenada, Santa Rosalia, and La Paz) and 17 other towns with more than 100 inhabitants. The total population of the towns is approximately 38,000 and that of the rural districts and small villages about 22,000. The towns near the international border (Tijuana, Mexicali, and Ensenada) and the mining settlements (Sta. Rosalia, El Marmol, El Arco, and Punta Prieta) are almost purely exotic in their dependence on outside capital and commodities. The older mining towns (Calmalli, San Antonio, and Triunfo) have dwindled from their maximum population but have become self-supporting. The other 12 towns are indigenous, being like the rural districts in having a high degree of economic independence. Excluding the exotic towns and considering only the indigenous communities and rural settlements, the number of people actually rooted to the soil is only about 34,000.

As a student of plant life and its dependence on environmental conditions, I have been impressed with the fact that the people of the indigenous communities in Baja California are controlled almost as closely by their physical environment, in their occurrence, distribution, and activities, as are the plants themselves. The four principal conditions which have limited the settlement of Baja California are almost identical with those which control the plant and animal life. These are (1) low rainfall, exceeding an average of 5 in. only in the high mountains, (2) scarcity of sources of water

for domestic and agricultural use, (3) scarcity of arable land, and (4) the poor representation of forage grasses. From these have sprung the important secondary condition that Baja California has a very small volume of products for export, almost limited to sugar, tomatoes, canned fish, tan-bark and pearls. There is also a very small output of cotton from the Colorado delta as well as the products of the mines, all of which are operated by foreigners.

To the adverse natural conditions must be added (1) the isola-

tion of Baja California from the mainland of Mexico, the nearest parts of which are also arid and sparsely settled, (2) the poor accommodations for outside intercourse which follow from the small value of the exports and consequent lack of good steamship service, and (3) the poor facilities for internal communication, which still are limited to saddle horse and pack mule, augmented recently in small part by automobile and truck.

In Baja California there is far less difference between the manner of life in town and country than there is in the United States. All of the people outside the exotic towns live close to nature and have a good knowledge of their environment, including geography, cli-

mate, soils, minerals, animals and plants. This knowledge is put to good use in seizing upon every available object or material that can be fabricated into some needed article for home, garden, ranch or pack outfit. Every article made at home helps to conserve the slender resources available for purchase or barter of items which can be had only by importation.

Among the common necessities that must come from abroad are cloth, ready-made garments, and most articles of metal or glass. Even in this field rope and thongs are made to take the place of nails, wire, bolts, buckles and chains; thorns do the duty of pins; hard wood serves for making hinges, bolts and catches; and gourds and earthern jars reduce the need for vessels of metal or glass. The number of articles made at home from domestic materials is innumerable. The craftsman is almost invariably familiar with the factory-made article for which he is making a substitute. His work is a labor of necessity as well as one of opportunity. Under domestic stress his work may be stout but crude, but such important articles as a pair of chaparrejos, a leather canteen or a saddle are made with care and art.

The type of home usually seen in small towns or in rural districts is made of stone, adobe bricks or wattle, according to the availability of these materials and roofed with palm thatch or tile. The furniture is scant and simple, with rawhide taking the place of stuffed seats and backs in the chairs. Shoes, hats, belts and a few other minor articles of apparel are made at home. In many houses it is difficult to find any imported articles except knives, forks, cooking vessels and flat-irons shaped like a flat-bottomed ladle and kept

warm by a few coals placed inside. Occasionally a sewing machine or a victrola will be found. The well is dug by hand and fitted with a wooden overhead windlass, horse-hair rope and cowskin bucket. A good garden is almost invariably found at even the humblest homes and is sure to have a display of geraniums, marigolds and stocks as well as vegetables, figs, oranges, pomegranates, dates, peaches and melons.

All of the indigenous towns have a location where exceptional topographic conditions assure a constant supply of water. In the exotic towns the supply is either small and poor, as in El Marmol and Punta Prieta, or else brought in at a great expense through long pipe lines, as at El Arco and Santa Rosalia. Not only does scarcity of water limit the agricultural operations of the indigenous communities but it does much to retard the working of mines situated where an abundant supply is not to be had.

The inland towns which depend upon relatively small seepages of water from large drainage basins in adjacent mountains are all sharply limited as to the amount of land that may be brought into cultivation. This is true of San Ignacio, Purisima and Comondu. In these towns arid volcanic mesas tower above the narrow band of fertile soil, cacti and desert shrubs descending to within 20 ft. of the orchards of figs and dates. In the Cape district there is a more generous amount of land available for Todos Santos and Santiago, but a very narrow band for San Bartolo, where some terracing of the lower slopes is done.

The towns located on the coast are in a position somewhat more favorable than that of the inland ones, since they have slightly less arid atmospheric conditions and are in a position to utilize the products of the sea. At El Rosario several hundred acres are cultivated with a very slender water supply on account of the conservation of soil moisture due to fog and low evaporation. Mulege is located at the narrow outlet of a small valley and has little arable land, as well as poor chance of a market for the fish which abound there. Pearl diving offers a precarious income there, as well as in Loreto and La Paz. Cabo San Lucas and San Jose del Cabo are very favorably situated, having an excellent climate, considerable soil, an adequate amount of water and an opportunity to use the products of the sea.

La Paz has long been the principal town of the peninsula. It is the capital of the Southern District, and prior to the sub-division of the peninsula was the capital of the entire territory. It is the principal port of entry in the south and the leading distributing center for imported merchandise. The harbor of La Paz is commodious and safe. The amount of arable land in the vicinity is almost nil and even the water supply is poor and precarious. In fact, La Paz comes near being an exotic rather than an indigenous town. The only industry is the processing of tan bark from palo blanco (*Lysiloma candida*). It has been stated that as many as $3,000,000 worth of pearls have been exported from La Paz in a single year, but if these figures are trustworthy they are surely far in excess of the average output. The citizens of La Paz spend far more for import-

ed articles than those of any of the other towns south of Ensenada. A great many of the people appear, however, to live almost as simply as if they were in a remote village.

The inhabitants of Baja California are a virile stock with the tradition, or perhaps the personal experience of living in a more congenial environment. They show a high degree of aptitude in making the best of the conditions under which they find themselves. Economic independence such as they exhibit is commonly regarded as synonymous with a low scale of living. When such independence, however, is built upon resourcefulness, ingenuity and industry it can do much to create a scale of living which is comfortable even if devoid of many of the paraphernalia which delude us into the belief that our own scale is higher than that of other races.

Coal Resources of China

BARBARA WOODRUFF
(Student Scripps College, Claremont, California)

The actual extent and distribution of coal reserves in China is a matter of considerable controversy but that vast resources exist is a certainty, and the resources of China as a whole have been estimated to be approximately 248,287,000,000.

The coal is widely distributed throughout the country, and reserves are known to exist in the outlying provinces of Sinkiang, Tsing-Hai, and Kansu. In China proper, there is a striking concentration in the Shansi-Shensi area of the north, but though the reserves are large, rugged topography and inadequate transportation facilities restrict mining operations and make the reserves of little value at present. The Kailan area, on the other hand, with much smaller reserves, is of great significance owing to its more favorable location for exploitation and marketing. Moreover, the Kailan coal, being of superior quality, makes good coke, and is in demand for industrial purposes. Throughout the southern provinces of China proper, there is abundant coal outcropping along the flanks of the mountains, supplying local needs.

Estimates of coal reserves in Manchukuo vary between 2,711,000,000 metric tons and 4,804,000,000 metric tons. Many of the deposits occur in very rugged country and are therefore, in many instances relatively inaccessible. The most important producing area is the Japanese-operated Fushun-Penhsihu-Yentai field, which provides 80% of the total Manchukuo production, and the bulk of the export coal. The field is served by a branch of the South Manchuria Railway which provides direct communication with the major industrial centers, and with the ports of Dairen and Antung.

Of the 48 modern mines, those with Chinese capital produce about 33% of the total, while those with Japanese and British capital produce 30% and 11% respectively. The modern mines are worked for the most part by open-pit methods and the per capita production per year is estimated at approximately 126 tons.

The effective development and utilization of China's vast coal resources are dependent upon: (1) the development of adequate transportation facilities, (2) the establishment of internal political stability, (3) stable currency, (4) increased industrial development, and (5) adequate supplies of skilled labor and capital.

Historical Geography of Northern Lower California*

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This paper aims to briefly characterize the principal cultural landscapes of the area involved and to evaluate the changing site of its natural regions.

BASIS OF AREAL UNITY

The first European occupants of Lower California were Jesuit missionaries who, beginning near the southern end of the peninsula, gradually extended a line of missions northward nearly to the latitude of 30° N. Following the expulsion of the Jesuits by the king, Junipero Serra, the Franciscan, extended the mission line by founding the mission of San Fernando de Velicta at 30° N. (see map) in 1769. He then proceeded to Upper California where he established San Diego Mission nearly in 33° N. The unoccupied area between San Fernando and San Diego became known as the Frontera, or Frontier, of Lower California. When the Dominican Order took over the peninsula, the Frontera was the only territory available for new missionary activity, and all of their new missions were founded there.

The Frontera has a natural as well as an historical basis for being regarded as a geographic unit. It is better watered than the deserts to the south, climatically and fluvially, for it is within reach of the southern end of many winter polar front storms and contains elevated lands in the interior. The west slope of the Frontera belongs principally to the Upper Sonoran Life Zone, in contrast with the Lower Sonoran to the south and east.

NATURAL LANDSCAPES

Four distinct natural regions are recognizable within the Frontera (see map). In the interior are two great granitic plateaus, a northern one, the Sierra Juarez, about 5000 feet in elevation, and a southern one, the Sierra de San Pedro Martir, averaging 7000 feet in elevation. These sierras, with snowy winters and occasional summer thundershowers, contain the only extensive coniferous forests of the Frontera, interspersed with grassy meadows.

The land of the sierras drops by degrees through a steppe and desert zone of rough mountains and occasional plains to a coastal zone of marine terraces. The terraces of the immediate coast are low and little dissected, but the highest terraces, several miles inland, have been eroded almost past recognition. The terrace region has a marine desert climate, with light winter rains and dense summer fogs. Along with characteristic desert plants, fog loving plants abound in the Terrace Region.

East of the precipitous eastern slope of the sierras and extending to the Gulf of California and beyond, lies the series of very hot,

*Data taken in part from the author's forthcoming book, "The Dominican Mission Frontier of Lower California," based upon five summers' work in the field, and research in the Bancroft Library.

dry, rain-shadowed deserts which may be called collectively the Colorado Lowlands.

Though the methods of utilizing these diverse natural landscapes have undergone radical changes under the imprint of successive cultures, the Terrace Region and a portion of the Colorado Lowlands have been the most attractive and except for brief periods have been the regions of most dense population.

The chief culture stages of the Frontera may conveniently be listed as the Indian, Mission, and Post-mission. Time demarcations between the several stages were not sharp. Even the earliest stage still affects portions of the Frontera landscapes today.

INDIAN LANDSCAPES

The Indians of the Colorado Lowlands were agriculturalists and formed a dense population near the Colorado River. West of the Sierra crest however the Indians were entirely non-agricultural and were dependent upon a gathering economy. Tradition says that when the padres introduced corn the Indians scorned it, calling it human teeth. Beef they called human flesh. The steppe and desert plant and animal life supported a sparse population living in small huts of brush and weeds. The forested sierras had no permanent inhabitants, due to the cold winters, but every fall groups of Indians moved into the pinon groves of the lower slopes of the sierras to lay in stores of pine nuts. In the spring, migrations took place to the coasts of the Gulf and the Pacific for the purpose of getting a supply of dried fish and salt.

The chief Indian population of the west slope occupied the coastal terraces, where food, in the form of clams and mussels, abounded. Large shell heaps remain as evidence of the importance of shellfish. Fish and sea otters were also caught, from tule balsas. Another attraction of the terraces was the particularly dense growth of the agave which formed the principal Indian plant food. Lagoons of salt, north of San Quintin Bay, were a local attraction of this region.

MISSION LANDSCAPES

With the beginning of missionary activity in the Frontera in 1774 development became even more concentrated in the Terrace Region than in Indian days, though for different reasons. Agriculture, introduced to the west slope by the missionaries, required level lands and irrigation water. Both were available in the broad valleys cut through the terraces by streams originating in the sierras. Little valley irrigation patches, with a group of white plastered adobe mission buildings, formed the nuclei of the new cultural landscapes. Another advantage of the Terrace Region was the facilitation of north-south communication by the smooth lower terraces. The main road of the Frontera, from mission days down to the present, has always followed the coastal route. All of the first five missions were established upon this route. Some of the best grazing lands occurred in the broad coastal terraces of the more humid, northern portion of this region, although this new industry also flourished seasonally in the elevated grasslands of the interior. Al-

so, a certain amount of trade with foreign vessels was carried on through the bays of the Pacific coast.

For many years it was hoped to establish a powerful mission on the Colorado River, amid fertile lands and abundant heathendom, linking Mexico and California by the Sonoran route. Partly to further this plan the Dominicans founded two missions in the interior of the Frontera, by good passes leading through the mountains to the Colorado Lowlands. One of these missions, San Pedro Martir, lay at an elevation of more than a mile above sea level, higher than any other missions of the Californias. The Colorado mission was never founded, due to the fear of Indian violence, which had destroyed earlier Franciscan missions on the River. Thus the populous eastern lowland region was a blank so far as mission landscapes were concerned.

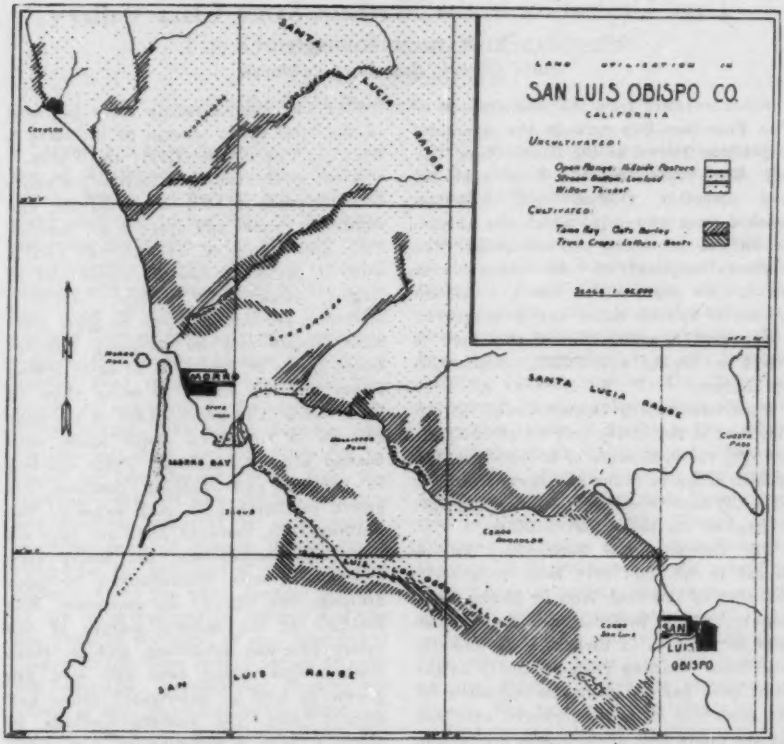
POST-MISSION LANDSCAPES

Due chiefly to the dying out of the Indians, the missions were given up. During and since the decline of the missions pastoral activity has dominated the Frontera landscapes. Lands were taken up in large cattle ranches by retired officers of mission troops; later by Mexicans from the mainland and Americans. In most of the mission valleys small communities still practise agriculture by means of irrigation. In the north, a colony of Russians practises large-scale wheat culture without irrigation in Guadalupe Valley. Fishing in Frontera waters by fleets from the United States and canning and drying establishments along the coast, are important modern developments.

In 1872 a sudden intrusion of people from the outside world had temporary direct effects and permanent indirect effects upon the Frontera. The occasion was a gold rush to the placers of San Rafael Valley, in the Transition Zone, east of Ensenada. Interest in the Frontera concentrated in the goldfields, and the capital of the Northern District of Lower California was moved from the old mission town of Santo Tomas to Real del Castillo, a mushroom mining town in San Rafael Valley. A more lasting result of the gold rush was the development of Ensenada, the nearest port to the goldfields and the gateway through which gold seekers arrived by the sea route. Since that time Ensenada has been the chief port of the Frontera, and in 1882, following the decline of the mines, the capital shifted back to the Terrace Region, to Ensenada. Other goldfields have been opened up from time to time.

The chief present attraction of the Terrace Region is its mild oceanic climate and accessibility to the United States. These qualities make of it the most favored tourist region of the Frontera. Ensenada, with its beautiful bay and beach, and Tijuana, with its propinquity to the United States, are the two chief towns of the western slope.

In contrast to the coastal terraces, with their tourism, are the Colorado Lowlands which, though climatically unsuited to tourists, have become of great modern importance as a producer of cotton. So marked was the growth of economic activity and population in



this region, that in 1915 the capital was transferred from Ensenada to Mexicali, the cotton metropolis of the Imperial Valley, where it has remained ever since.

In the future tourism and agriculture may both be expected to expand, especially in the Terrace Region. At San Quintin and Tijuana juxtaposition of adequate storable water and well-situated plains has led to the formulation of government irrigation colony projects involving large dams. The makings of a salt industry are also present, at the San Quintin lagoons.

Indications are that the historically important Colorado Lowlands and Terrace Region will continue to be of special attraction to the people of the Frontera.

Land Utilization in the Northern Santa Clara Valley

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Southeastward from the southern arm of San Francisco Bay extends the structural depression known as the Santa Clara Valley. The depression has been aggraded and smoothly floored with alluvium washed from mountains which rise abruptly on the northeast and southwest. The northern segment of the valley, with which this paper deals, has a maximum width of fifteen miles and a length of about twelve miles. Within this area is found a highly specialized, commercial agriculture.

Four outstanding characteristics of agriculture in the valley may be noted. They are: (1) the dominance of horticulture, (2) specialization in prune and apricot production, (3) areal specialization, and (4) specialization on individual holdings.

The dominance of horticulture is apparent in the fact that more than sixty per cent of the crop land of Santa Clara County, which includes the area under consideration, is in orchard. The climatic conditions resulting from proximity to the coast plus partial insulation afforded by the mountain walls have proved excellent for the production of deciduous fruits. The existence of large bodies of fertile, alluvial soil, and the availability of ground water which can be lifted by pumps and applied during the rainless summer also have forwarded the extension of fruit culture.

The prune and apricot industry is of first importance. Over sixty per cent of the orchard trees are prune, and apricot trees account for another twenty-four per cent. Of the remaining sixteen per cent more than half are pear trees. The importance of the prune and apricot industry may be attributed, in part, to advantages of an early start and of large scale production. The California prune industry was first established in the Santa Clara Valley and approximately forty per cent of the total prune acreage of the state is found in this comparatively small area.

Areal specialization reflects adjustments to differences in soil, slope, altitude, and exposure. Prunes and apricots are successfully grown only on well drained, friable soils of piedmont alluvial slopes and of larger, stream-built ridges. Apricots, moreover, are chiefly grown on upper piedmont slopes and on adjacent hillsides where losses of fruit due to early spring frosts are less likely to occur than on lower lands. The greater part of the pear acreage is found on lower lands with heavier soils and subsoils. Pears superior in keeping and shipping qualities are grown on lands with clay subsoils. The heaviest soils, however, have not been occupied by orchardists; the heavy clay and adobe soils characterized by poor drainage are utilized by dairymen. The foothills at the eastern margin of the valley face the southwest, and on these warm slopes spring peas and corn are grown as well as unirrigated prune and apricot trees. The western foothills, in contrast, have a northeastern, less warm exposure, and are little used for agriculture.

Specialization on individual holdings is very marked. This is possible because the labor of an individual can be applied efficiently throughout the entire year to the production of a single commodity, and because an adequate market and marketing organization for that commodity are available. Specialization is desirable because it permits the use of a given plot for that purpose to which it is best suited, because it reduces investment in specialized machinery, and because it permits mastery of the complicated technique essential to the growing of high quality produce.

The Quirigua Region of Guatemala

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Largest and most important of the rivers of Guatemala is the Rio Motagua which rises in the western highlands and flows northeast to the Gulf of Honduras. Following the course of the Motagua takes one through a rapidly changing series of climatic and vegetation zones. In the highland area of Guatemala City the landscape is characterized by rugged mountain slopes with a covering of pine, the streams leaping over falls and rapids in deep gorges. As one descends the northern edge of the plateau, the region becomes perceptibly less moist and the pines are replaced by broad-leaved forest. Here the landscape, with its corn patches, pastures and woodlots separated by stone fences, resembles parts of Eastern United States except for the buildings of white stuccoid adobe and red tile roofs. Zacapa, junction of the trans-Guatemalan railway and the line from El Salvador, is in a true desert area with less than twenty inches of rainfall annually. Surrounding Zacapa are groves of dry, gray-green palms, giant cactus, and extensive grasslands. From this region, each mile downstream brings a change in character and density of vegetation. Desert palm and cactus disappear and grasslands give way to brush, woodland, and eventually the equatorial rain forest. The towns of adobe and tile are replaced by collections of palm-thatched huts. This lower portion of the Motagua Valley, with its wide meandering stream, is the Banana Empire, domain of the United Fruit Company.

Quirigua is but one of many stations of the Company, headquarters of a plantation or "farm." Practically all is Company property, the hospital, hotel, offices, store, and workers' barracks. The fruit cutters employed are mostly English-speaking Jamaica negroes. The "farm" is penetrated by spur railway lines and narrow gauge tracks to facilitate the gathering of the fruit which is cut Thursday and Friday of each week in preparation for the Saturday sailing from Puerto Barrios to New Orleans. The United Fruit Company has taken many precautions for the care of its white employees, providing good homes, hospitals, sanitation, a program of entertainment and social intercourse among the widely separated families. As a result there is no visible effect of the Tropics, either on physique or morale. The ruins and monuments of the ancient Mayan city of Quirigua are preserved in an 85-acre plot of uncleared forest entirely surrounded by the banana lands. The ruins of this city, founded in the 5th century A. D., are important for the beauty of their sculptures and their perfect regularity of sequence, but they are seldom visited and are fast disintegrating.

Majorca

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Majorca, as indicated by its name, is the major island of the Balearic Archipelago. This Archipelago, like so many of the island groups of the Mediterranean, is an extension of the mountains of the mainland into the sea.

The Sierra Nevada mountains of southern Spain extend in an easterly direction from Gibraltar to "Cabo de la Nao." Their structure is essentially Alpine. This Alpine structure consists of the Atlas mountains of North Africa as the southern element. The central section includes the crystalline Sierra Nevadas and the crystalline rocks that sank below the Gulf of Alboran except for Alboran Island, a remnant, that stands above the water. And finally, Bettian Cordilleran limestone forms the northern element. These limestones of the north are sharply folded, broken and overthrusted to the north and northwest. The extension of the Bettian mountain system into the Mediterranean forms the basic structure for the Island of Majorca.

The island may be divided into three distinct physiographic sections. First, the highly calcareous, rugged, karst landscape of the northwest mountainland; second, the hilly landscape of the northeast coast, and third, the recent marine deposits of the central valley and southeast coast. The mountain of Puig Major reaches 4800 feet, the highest altitude on the island. The southeast hilly land has its highest elevation in Puig Morey (1400 feet).

The climate is a pure Mediterranean type, hot, rainless summers and warm rainy winters. There are two maximum periods of precipitation, one in April and another in November. The total precipitation per year for Palma, the largest city, is twelve inches. However, the rainfall is much heavier on the north and northwest coasts of the island. From the vegetation complex and the observations of private stations a climatic line according to Koppen's system could be drawn from Banalbufar, through Inca, to Manacor near the southeast coast. This line would divide the B S climate of the southern part of the island from the C S northern section.

The vegetation of Majorca is highly xerophytic in character and falls readily into natural and cultural forms. Under the natural vegetation are many varieties of Chaparral or the French "Garrigues." The tree growth is mostly Mediterranean pine (Pinus halepensis) and live oak (Quercus ilex). The cultural vegetation consists of almonds, figs, olives, oranges, grapes and rice. Oranges grow well only in the protected valleys of the island and particularly in the Soller valley on the northwest coast. The cultivation is mostly on the "terra rosa" soil of the central and southeast lowland.

Settlement of the island has been traced back to a pre-historic tribe of Iberians who lived in stone houses built in the shape of a bee hive. The first authentic history begins with the conquest in 210 B. C. by the Carthaginians under Mago, a brother of Hannibal. Next in 123 B. C. the Romans founded the town of Alcudia, somewhat later Palma and Pollentia. It was 550 years later in A. D. 425 that the Vandals broke the power of Rome and seized the Balearics. Nine years later it was recaptured by Justinian. The centuries then lapse until 716 when the Moors gain complete control. They settled the island and developed its towns and irrigation systems. With them originated many place names such as Banalbufar, Felantx, Andraitx and Binisalem.

James the First of Aragon reconquered Majorca from the Moors in 1230, and it

has remained ever since in Spanish hands. The people of today are greatly mixed with Catalonian and Moorish traits dominating. The rural districts still use the Catalonian dialect, although Spanish is the official language.

Geography in the Secondary Schools of the Pacific Coast States

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The "Conference on Secondary School Geography" recommended, in 1893, that physical geography be a required subject for all students in the first year of high schools. As a result, increased attention was given the subject and modern texts were written, the first of these by Tarr and the second by Davis and Snyder.

In 1898 a second national committee made a report similar to that of the "Conference." Physical geography was to be offered in the first or second year, with laboratory and field work, but was to be elective for students taking classical courses.

The texts written and the courses given in response to the recommendations of these committees, were too technical and presented too little of human interest. With a view to improving this condition, the Science Section of the National Education Association appointed another committee. In 1909 the writer, as chairman, presented the report which recommended as follows: (1) That geography should be a required subject in secondary schools. (2) That the minimum time devoted to it should be one year. (3) That there should be a minimum of five periods weekly. (4) That geography should be a first-year subject. (5) That approximately one-fourth of the time should be devoted to field and laboratory work. (6) That one-half year should be given to a humanized physical geography, followed by a study of the chief countries, with emphasis on North America and Europe.

In 1935 an inquiry was sent to the superintendents of public instruction and to 55 city superintendents in the Pacific Coast States. A summary of the 47 replies received indicates that in Washington 19 per cent of the junior high and 1.8 per cent of the senior high school students were studying geography. For Oregon the figures are 25 and 3; for California, 2.7 and 1.5. In Washington and California political geography predominates, but in Oregon physical geography holds first place. Generally speaking, social science has taken the place of geography. In some cities commercial geography is required of senior students who are taking a commercial course.

In their attention to secondary school geography the schools of many states are in advance of ours, as are those of the countries of western Europe.

The writer believes that geography should be a required subject, preferably in the eighth or ninth years. A humanized course in the physical environment of man should be followed by a study of natural resources, production, manufacture and distribution and concluded by the regional geography of the United States or North America. A second course of one year, devoted to the regional geography of the remainder of the world, should be required of senior students. This emphasis is justified by the recognized value of a knowledge of the subject. As individuals and through organized effort we should endeavor to secure for geography a more prominent place in the secondary schools of the Pacific Coast States.

Northern Nigeria—A Study in Political Geography

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Between the vast arid expanse of the Sahara and the dense tropical rain forests along the Guinea Coast lie the provinces which constitute Northern Nigeria. Politically the region is interesting in that the regulations laid down by the League of Nations for the government of mandated territory were based upon the policy which Lord Lugard and his associates had formulated in Nigeria.

From the densely forested, swampy, coastal plain the land rises gradually to a belt of comparatively level park-like country which finally merges into the sandy wastes of the Sahara. The continuity of the region is broken by the Bauchi Plateau, an extensive area of rugged highland some 4000 feet above sea level, long an area of refuge. Northern Nigeria experiences a definite rhythm of wet and dry seasons, temperature and aridity increasing from south to north. Vegetation is closely adjusted to rainfall conditions, the rain forest of the south giving way successively to belts of deciduous trees, orchard bush, savannah, and finally of thorn forest. Because of heavier precipitation, vegetation on the Bauchi Plateau is more luxuriant than on the surrounding plain.

The distribution and character of the population were determined largely by the trans-Saharan trade routes which converged on Kano and Sokoto, which early became the centers of relatively densely peopled areas. This is still the most densely populated part of the country. Southward the population thins out but in recent years there has been a noticeable increase in settlement there owing to the establishment of economic security and the abolition of the slave trade under British rule. The country was settled by a succession of infiltrations from the north, the weaker peoples being pushed southwards into the rugged fastnesses of the plateau region and into the rain forest belt. Of these invaders, the Hausas, Bornuese, and Fulani, none of whom were negroid, have long been the dominant groups. The outstanding trait of the latter has been their aptitude for effective rule and organization, and it was upon the tribal organization and institutions which they developed that the present system of "Indirect Rule" was founded.

Northern Nigeria is primarily an agricultural country and through the years the natives have developed an agricultural system which is closely adapted to Nigerian conditions and needs. Food crops, principally millet, guinea corn, gero, and maize, are interplanted with cotton. "Shifting Cultivation" is the general rule since the non-use of fertilizer results in rapid soil exhaustion. The British have deliberately set themselves the task of improving rather than changing native practices with the object of raising, not export crops, but the standard of living of the people. Nigeria is the only country where the principle of trusteeship is actually applied. Native handicrafts have long supplied the main articles of commerce by the Hausa traders. The production of cotton cloth, leatherware, and metal products, has likewise been encouraged and equipment suited to the needs and means of the native craftsman introduced. The building of railroads and roads has favored the expansion of internal trade and stimulated native production. Taxation, levied through the native rulers, has been regularized although the traditional sources have been retained. Revenue is likewise expended through native organizations. Considerable attention is being given to social reform, especially in respect to health, sanitation, education, and other local needs. Every phase of

political control is exercised through the appropriate native official. In this way the foreign control is less likely to provoke opposition and yet be able to achieve its ends—the ordered development of Nigeria for the Nigerians.

Apart from agriculture Northern Nigeria has rather limited resources. Of these alluvial tin deposits in the Bauchi Plateau are the most important and constitute the main export commodity. Under the present regime, largely through the building of railways, production has been facilitated, and the country ranks fourth in world output.

The British have been able to establish in Northern Nigeria a successful system of colonial government based upon the use of indigenous institutions which have been evolved over a long period of time and which are closely adapted to environmental conditions. Many problems remain, but an ordered existence has been made possible and economic development is being fostered along lines best suited to native interests and geographic conditions.

Development and Sites of the Papago Villages of Arizona and Sonora

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The Papago Indians, numbering about 5,500, are almost the sole occupants of about 5000 square miles of desert country in southwestern Arizona and northern Sonora. They have been noteworthy for their ability to maintain self support and practice agriculture in an area uncoveted by the white man and with rainfall considerably below that usually considered the sustenance level.

The present villages may be traced to about twelve common centers from which new communities have been established over areas coinciding fairly well with the larger physical units of the region. The village sites are determined chiefly by two sets of factors centering upon a dependable supply of water for drinking and domestic purposes, and by the distribution of tracts with a combination of soil and moisture conditions making cultivation possible. Until recently these two factors were almost nowhere to be found together, and inter-village migrations were necessitated. The two types of villages may be geographically designated as "piedmont or mountain villages," and "plains villages." The first were formerly the more important, being located at springs or on sandy washes leading from the mountains and carrying underground water. Favorable soils are found only on the open plains where flood waters can be spread from the shallow washes, local fans or the intersections of drainage channels. The names of most Papago villages are suggestive of their situations.

Sinking of wells by the United States Indian Service, combined with a tendency to shift to a grazing economy, has reversed the relative importance of plains and piedmont villages.

The cattle industry has seemed most promising as a means of support, but in the occasional severe and protracted droughts such as has been experienced in the last two years, many thousands of the cattle perish from starvation or thirst and the herds are reduced to the lowest terms. But for the government program providing employment, these Indians would be in a critical situation at the present time.

Geonomics of the Rogue River Valley

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The Rogue River Valley represents an area of about 300 square miles of arable land cut out of the Klamath Mountains of southwestern Oregon by the Rogue River and its major tributaries. Climatically the valley represents the more arid phase of the Temperate Marine type of climate. Winters are cool; summers are dry and hot. The rainfall averages from 15 to 18 inches in the eastern part between Medford and Ashland, up to 25 inches at Grants Pass. Seasonal distribution is bad and the amount is independable as well as low. It is little wonder that the agricultural specialization of the valley has awaited the development of irrigation.

Gold discovered near Jacksonville in 1852 while the valley was being used as a traverse route between the Willamette and California, led to the first rush of settlers, ushering in boom town conditions in the gold areas. However, agriculture supplying the needs of the miners soon became more attractive than gold panning to most of the immigrants.

Unlike many agricultural supply centers for the boom towns of the west, the Rogue River valley did not suffer a complete slump from the decline of the placers, which took place after 1864. Grain and meat production declined, to be sure, and the valley was reduced to a subsistence economy until the coming of the railroad and the development of irrigation made possible a highly specialized agriculture that could overcome, to some extent, the isolation of the region. Pears met the requirements, and today the Rogue River harvests some 2,000,000 bushels, or approximately 17 per cent of the commercial pear crop of the United States. Cooperative organization has made possible the marketing of this fruit in the high-priced markets of the East and in Europe. Canneries put up that part of the pack which cannot reach a profitable fresh fruit market. High cost transportation is still an economic problem to be met, however, and Rogue River shippers are constantly at work trying to achieve a slight advantage. Shipping northward to Portland is the most economic route at present, although many carloads are still taken over the Siskiyous to the ports of central California.

Peaches, apricots, cherries, walnuts, and filberts are also grown in commercial amounts, as are small fruits and berries. Irrigated or sub-irrigated forage crops support a thriving dairy industry.

Manufacturing is centered chiefly around the processing of lumber products and the processing of foods. Bases are lacking for much heavy industry, although the precipitous gradient of the Rogue River in its upper reaches and an exceptionally favorable catchment area, assures an even flow and provides a possible hydro-electric output of a half million horse power. Thus far only 59,000 horse power is developed, and whether a market for the maximum power could be found is at present problematical.

Some fifty-three marginally located minerals are to be found in the mountainous rim. Gold is the only one mined to any extent, and most of its significance lies in the past. It is estimated that from $100,000,000 to $150,000,000 worth of gold has been taken from the Rogue River mines since their discovery. Today the output is slightly over $10,000 a year, with a slight upturn due to depression placer reworking of some of the old beds.

Crater Lake, Oregon Caves, and other natural scenic features of the Pacific and Redwood highways, attract thousands of tourists to the region, and Grants Pass,

Medford and Ashland owe not a small part of their well-being to the entertainment of tourists.

The surrounding mountainous topography and resulting inaccessibility has exercised a highly selective force in molding the ecological pattern of the occupants. It has brought about a high degree of social selectivity and integration. It has meant that if the valley is to be a supply center for any class of economic goods such goods must be of a concentrated and valuable type in order to compete with more favorably located districts. That the inhabitants of the valley have adjusted wisely is evidenced by the cultural landscape. As one drives through the valley an air of prosperity seems to prevail. Well-painted homes, urban or rural, beautiful lawns, shrubs and shade trees, good roads, well-groomed orchards, truck gardens, and fine livestock greet the eye, and indicate a substantial regional wealth. It seems evident that the Rogue River valley possesses sufficient regional resources to enable it to be known as a center from which a distinctive culture emanates, and a region equal to few others as a delightful place in which to live.

Observations Bearing on the Development of Meanders in Intermittent Streams

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The paper dealt with arroyos cut in valley fills in northwestern New Mexico. These channels are new, produced during the past few decades by accelerated runoff resulting from overgrazing. Though new, they generally have sinuous courses, in which typical meander forms are frequent. Detailed maps of selected sections of stream courses were displayed as lantern slides, which show the development of sinuosities from accidentally located depressions excavated by the streams flowing in the older smooth-bottomed valleys. Through headward extension of these originally discrete depressions, the sinuosities of the arroyos are produced. The meander forms result from sideward cutting in irregular bends, which gradually take on smooth curves.

Examination of the true meander forms leads to an inquiry into the typical shape of a meander. Measurements made of the change in radius of curvature along the sinuosities of the arroyos mapped indicates that the developed meander through most of its length approaches the form of a logarithmic spiral, rather than the arc of a circle, as has been supposed.

A Modification of the Koppen Criteria for Determining Seasonal Distribution of Precipitation

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According to the Köppen climatic classification, the differentiation of humid and dry climates is dependent upon the three variables: precipitation regime, total annual precipitation, and mean annual temperature. In applying all three of these variables in a study of climatic variability in the western United States, it was found that the Köppen criteria for precipitation regime were unsatisfactory. The dependence of the regime upon the amounts of precipitation of a single month in each of the two seasons means that the occurrence of little or no rain in one winter month and in one summer month automatically classes the station as having a uniform regime, irrespective of the seasonal totals. R. J. Russell, in a study of the dry climates of the United States published in the University of California Publications in Geography, volume 5, 1931, presented a modification of these criteria. This is, however, too elaborate for use in connection with climatic variability since, according to it, a station may be classified as any one of twenty-seven different types in successive years. Russell, in his method, considers only two of the three months of each season because he feels that the use of all three would give too much weight to erratic months. An examination of climatic records readily shows that the consideration of only two months instead of three will give greater weight to an "erratic" month. The record of Ricardo, Texas, will illustrate this point.

Dec. 1.16	June 3.34	Jan. 1.15	June 3.41
Jan. 1.15	July 1.90	Feb. 0.83	Aug. 1.96
Feb. 0.83	Aug. 1.96	1.98	5.40
3.14	7.30		

Since the summer is the wetter season, one would take the mean of the two wettest summer months and of the two driest winter months, according to Russell, as a basis for determining the precipitation regime. Accordingly, the two "typical" or driest winter months would be January and February while December, which has only 0.01 inches more than January, is left out of consideration. Similarly, July with 0.06 inches less than August is omitted in preference to June with 1.54 inches more than July. Certainly, this approach gives too much weight to an erratic month.

In the Geographical Review for January, 1935, H. M. Kendall, in an article on climatic boundaries of the eastern United States, suggests that summer concentration can be said to occur when 70% of the precipitation falls during the summer six months and likewise 70% falling in the winter six months will give a winter concentration. No indication is given that these values are other than arbitrarily chosen and their significance must be questioned since no consideration is given to the relative effectiveness of winter and summer precipitation.

The most accurate statement of the seasonal distribution of precipitation is certainly the one which takes into account the total precipitation of the seasons. In order to find a suitable set of ratios to use with seasonal totals, the records of about one thousand stations were plotted. The ratios of single months were used as abscissae and the ratios of the seasonal totals or ordinates. Separate graphs were made for stations with dry summer regimes and those with dry winter regimes. The ratios thus empirically determined were 1.5 for a dry summer regime, instead of 3 as used by Köppen, and 4.5 for a dry winter regime instead of 10.

A map of the climates of the western United States, based upon climatic means, drawn to test the validity of these values, proved them to be quite satisfactory.

Winter Air Mass Convergence in the North Pacific Ocean

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During the past half century several studies of cyclone tracks have been made in the United States, but so far as can be determined none have yet been published for the north Pacific area that are based on consistent and complete data. The Imperial Marine Observatory at Kobe has made possible such a study through the publication of daily weather charts, and it is upon data furnished by these charts that this paper is in large part based.

Cyclone frequency maps were made by L. B. Corwin and the writer by tabulating the frequency of cyclone paths for each five degree square of latitude and longitude in the north Pacific for the decade, 1923 to 1932, inclusive. The twelve months of the year were grouped in pairs so that the resultant maps show January-February, March-April, May-June, etc., frequencies of storm paths. To facilitate the interpretation of these maps isarithms were drawn at decimal frequency intervals.

A study of the three maps of winter months (November to April, inclusive) shows two well marked zones of frontogenesis, one extending from the vicinity of the East China Sea through the Japanese archipelago, across the north Pacific between latitudes 40° and 50°, and terminating in Bering Sea (region of Bristol Bay), the other describing an irregular curve in the Gulf of Alaska. In sharp contrast to this the group of maps representative of summer conditions show nothing comparable in the way of high cyclone frequency zones. It is concluded from this that no well defined fronts of the atmosphere persist south of Bering Sea from May to October.

The most significant conclusion derived from this study pertains to the location of the Pacific polar front. Reference to Physikalische Hydrodynamik, 1933, of which V. Bjerknes is the senior author, explains the Norwegian use of the concept of deformation. Through the application of this concept the position of the Pacific polar front is established for the month of February. Upon investigation it is found that the neutral point of the deformation field thus derived lies in an area registering no cyclone tracks in ten years, while the front passes through a zone having fewer than ten cyclone tracks during the decade of observation.

Otherwise stated, the Bjerknesian front lies approximately twenty degrees south of the axis of maximum cyclone frequency. That this axis is a valid criterion of the location of the front in question is partially borne out by air temperature data, regrettably, however, available only for stations in the Japanese group of islands. Further corroborative evidence is furnished by Horace Byers' paper on the Air Masses of the North Pacific in which he states that 70% of the frontal systems of the north Pacific area have their origin in the general region of the East China Sea, from whence they travel in a northeasterly direction toward the Gulf of Alaska.

As for the principal air masses involved, the Norwegians have concluded that maritime polar air converges with maritime tropical air to form the Pacific polar front. This is a logical designation of air masses considering their location of the front. If, however, the front is found to lie twenty degrees to the north, as it is the writer's contention that it does, the maritime polar air will no longer be in a transitional state, but simply polar continental air converging with air of tropical Pacific origin.

Other findings in this study concern the Pacific arctic front located in the Gulf of Alaska. Here, again, the axis of maximum cyclone frequency does not coincide with the front delineated by the Norwegians, although the discrepancies are much less marked than in the case of the Pacific polar front. The front, as located through the use of the cyclone frequency maps, was compared with Werenskiold's lines of air convergence and strong agreement was found to exist between the two. The principal air masses involved have been derived from the synoptic charts of the California Institute of Technology, from Byers' paper, and Werenskiold's air transport maps with the decision that along the Pacific arctic front North American polar continental air converges with transitional polar Pacific maritime air.

Iron Ore Resources of China

WILMA BELDEN, LEWISTON, MONTANA
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Iron ore is widely distributed throughout China, but the resources are much less abundant than is generally supposed. Commercial production is limited to three major fields: Southern Manchukuo, the Peiping District, and the Lower Yangtze Valley, of which the first mentioned is by far the most important at the present time.

The total iron ore reserves of China are estimated to be only 1,000,000,000 tons, of which 750,000,000 tons, or 75%, are in Southern Manchukuo (Liaoning). The greater part of these Manchukuoan reserves are Archean, and occur in a narrow field extending across the Liaotung Peninsula between the Yalu and Hun rivers. The metallic content of this ore averages approximately 30%, though in some places, notably Miao-er-Kou, rich veins of 60% ore are being worked by open pit methods. The mines are being developed extensively by the Japanese to provide pig-iron for export to Japan.

The greater part of the ore reserves of China proper are found in the north, those of Huan-Lung area of northwest Hopei and the Yangtze Valley being the most important. The reserves of the Huan-Lung area are estimated at 90,000,000 tons and their metallic content runs as high as 55%. The magnetite-hematite ores of the Yangtze Valley belt, containing from 40% to 60% iron, are of greatest economic value, excluding those of Manchukuo. The richest deposits occur on the western margin of the region, in Hupeh, where the Tayeh ores are found as a seam 200 feet wide.

Numerous deposits are found in widely scattered areas throughout southern and western China, and in outer Mongolia, Kansu, Sinkiang, and Szechuan, but in most cases the iron content is low, the reserves are small, and conditions are unfavorable for mining operations.

The iron mines are usually small, seldom employing more than 100 men, frequently as few as 20, and even in the Japanese-controlled mines, where modern methods have tended to increase the average labor efficiency, the production per man per year is relatively small.

What Is the Warmest "Month"?

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The maximum monthly temperature as usually shown by the July or August mean, may sometimes differ appreciably from the mean of the 30 warmest days. To determine the extent of this difference, a comparison is made of the July and August means with the mean of a 30-day period from July 16 to August 14 for 157 stations in the United States whose daily means are given in Supplement 25 of the U. S. Weather Bureau. The results are shown in the form of an isopleth map. The difference between the 30-day mid-month mean and the July mean is found to range from —.7 degree F. to +1.1 degree. The map clearly shows the effect of large bodies of water in retarding the arrival of maximum temperatures along the Pacific and Atlantic seaboards and the shores of the Great Lakes. It also brings out the effect of spring and early summer rainfall as contrasted with later summer rainfall. Certain striking anomalies remain, showing notable relatively local variations not related to time of maximum rainfall, cloudiness, wind direction, or any other meteorological conditions determinable from available data.

Field Work Suited to Freshmen Classes

VINNIE B. CLARK
State Teachers College, San Diego, California

Describes a typical field trip required of Freshmen students of Geography.

Route.

From San Diego over mountains to desert on leeward side of mountains. Distance 85 miles. Highest point 4219 feet.

Time Required.

Varies from a day trip from 7:00 a. m. to 7:00 p. m. to a week-end trip from Friday p. m. to Sunday p. m. with field house at Kentwood, on divide.

Method of Travel.

Sight seeing buses, only, in future. About 30 students in each group.

Aims.

1. To concentrate the powers of observation on features of the landscape.
2. To create an interest in the interpretation of the landscape.
3. To illustrate certain basic geographic principles.

Method.

1. Each student is supplied with an outline of subject matter for trip.
2. During class time, before trip, the geographic principles involved are taught.
3. Major features are stressed on trip.
4. Instruction is repeated on recurrent major features as trip continues.
5. Details are taught according to time and ability of group.
6. Written report is required from each student illustrated by his own photographs or pen-and-ink sketches. (Views cut from printed matter not permitted.)

Results.

While no student learns everything that might be observed, yet all learn something regarding observation, relationships and methodology.

The Need for a Harmonious and Aggressive Front on the Part of School Geographers

H. W. FAIRBANKS
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For some years the process of undermining the position of geography in the elementary school has been going on. This is being accomplished chiefly through two agencies. One is the active and purposive efforts of those who claim that it is a social study and should be fused with the social study group generally held to include history, civics and economics. The other is the failure of geography teachers themselves to agree as to the fundamental nature of their subject and allow everything which has no definite place of its own in the curriculum to be taught under the head of geography.

We are making little progress either in defining the subject, rationalizing its outlook, or getting rid of the archaic and unscientific methods and conceptions of the past. If geography is not a science but only a description of the earth and its inhabitants, if it is only an aggregate of miscellaneous facts, it might better be turned over to the social study advocates to do with as they please.

If geography is a science its beginnings in the elementary school are worthy of our careful thought. It deserves an independent place here. If such a place is lost or if unpedagogical and unscientific methods continue to be employed the results will continue to be manifest as they are now. The maintaining of an independent geography, as well as the conceptions behind the subject, and the method of instruction employed in the lower schools should be of vital interest to university geographers for their work is seriously affected by them.

The advocates of a fusion social study course see in geography little besides its social aspect. They fail completely to comprehend that, handled from this point of view, its essential nature is destroyed and its latent educational value never developed.

Real geography can exist in the elementary school only as an independent subject. Experience has shown that when combined with history it has always lost out, and we are justified in asserting that it always will for it is a psychological impossibility to combine two objectives as different as are those of history and geography in the same course. What results is practically nothing but history.

School geography has a host of earnest supporters but they are working at cross purposes for there is an unreasonable and unnecessary divergence in their views.

Is it not possible for geographers from the primary to the university to develop as great a degree of harmony in their methods and objectives as do specialists in other sciences? We certainly cannot admit that the nature of our subject makes this impossible. It is only through an harmonious and aggressive effort of geography teachers of all grades that the individuality of the subject can be preserved.

The danger of fusion with the social study group is real. If it is carried to its logical conclusion the loss to real education will be irreparable.

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